

1 **DIRECT TESTIMONY OF**

2 **JOSEPH K. TODD**

3 **ON BEHALF OF**

4 **SOUTH CAROLINA ELECTRIC & GAS COMPANY**

5 **DOCKET NO. 2009-2-E**

6  
7 **Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND POSITION**  
8 **WITH SOUTH CAROLINA ELECTRIC & GAS COMPANY (“SCE&G”**  
9 **OR “COMPANY”).**

10 A. Joseph Todd, 111 Research Drive, Columbia, South Carolina. I am  
11 employed by South Carolina Electric & Gas Company as General Manager, Fossil  
12 & Hydro Operations.

13 **Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND YOUR**  
14 **BUSINESS EXPERIENCE.**

15 A. I earned a Bachelor of Science Degree in Civil Engineering from Clemson  
16 University in 1980. I began my career with Duke Power that same year working  
17 as a structural engineer for several nuclear plants. I started working with SCE&G  
18 in 1981 as a Structural Engineer for V.C. Summer nuclear station in Jenkinsville,  
19 SC. In this capacity, I participated in the startup and initial operation of this  
20 facility and continued working at V.C. Summer until 1990. In 1990, I transferred  
21 to the Fossil/Hydro division of SCE&G and assumed a project management role  
22 for initial work on the Cope project along with a number of other environmental

1 projects. I also served as Assistant Manager of McMeekin Station from 1995 to  
2 1998 before returning to a project management role for several environmental  
3 projects including SCR installations at Williams and Wateree. Subsequent roles  
4 included Business Manager of the Company's power operations on the Savannah  
5 River Site, and Manager of Fossil/Hydro Outage Planning. I assumed the role of  
6 General Manager, Fossil & Hydro Operations in February of 2007. In this  
7 position, I report to the Vice President of Fossil Hydro Operations.

8 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

9 A. The purpose of my testimony is to review the operating performance of  
10 SCE&G's Fossil/Hydro units and South Carolina Generating Company's  
11 ("GENCO") Williams Electric Generating Station ("Williams Station") during the  
12 period February 1, 2008 through December 31, 2008 ("Review Period").

13 **Q. PLEASE GIVE A SHORT DESCRIPTION OF SCE&G'S FOSSIL AND**  
14 **HYDRO ELECTRIC FACILITIES.**

15 A. SCE&G owns and operates ten (10) coal-fired fossil fuel units (2,475 MW),  
16 eight (8) combined-cycle gas turbine/steam generator units (gas/oil fired, 1,317  
17 MW), fourteen (14) peaking turbines (314 MW), four (4) hydroelectric generating  
18 plants (221 MW), and one Pumped Storage Facility (576 MW). In addition, we  
19 receive an output of 90 MW from a cogeneration facility. The total net non-  
20 nuclear summer generating capability rating of these facilities is 4,993 MW. The  
21 ratings stated in this testimony are updated at least on an annual basis.

22

1 **Q. PLEASE DESCRIBE GENCO AND ITS RELATIONSHIP TO SCE&G.**

2 A. GENCO was incorporated October 1, 1984, as a SCANA subsidiary.  
3 GENCO owns the Williams Station. GENCO sells to SCE&G the entire capacity  
4 and output from the Williams Station under a Unit Power Sales Agreement  
5 approved by the Federal Energy Regulatory Commission. By Order Number 84-  
6 982 issued in Docket Number 84-388-E, the Public Service Commission of South  
7 Carolina authorized the creation of GENCO and the transfer of ownership and  
8 operation of Williams Station from SCE&G to GENCO. Hereafter, when I refer to  
9 SCE&G's fossil steam plants, I include GENCO.

10 **Q. HOW MUCH ELECTRICITY WAS GENERATED BY SCE&G IN THE**  
11 **REVIEW PERIOD?**

12 A. In the Review Period, SCE&G generated 23,406,189 megawatt hours  
13 ("MWH") of energy.

14 Of this energy, the fossil steam plants generated 65%, the combined-cycle  
15 units generated 12%, the gas peaking turbines and hydro facilities generated 4%,  
16 and the nuclear plant generated 19%. Exhibit No. \_\_\_ (JKT-1) provides a graphic  
17 display of how the generation met this Review Period's energy demand.

18 **Q. PLEASE SUMMARIZE THE PERFORMANCE OF THE FOSSIL UNITS.**

19 A. Overall, SCE&G's fossil units have operated efficiently and dependably in  
20 the eleven (11) month period from February 1, 2008 through December 31, 2008.

21 Our fossil units have received national recognition for their excellent heat  
22 rates. These measures will be covered later in my testimony. We also had a

1 94.77% availability factor and a 1.51% forced outage rate for the peak summer  
2 load period between June 1st and September 30th of 2008.

3 **Q. PLEASE DISCUSS SCE&G'S PLANNED OUTAGES FOR THE PERIOD**  
4 **UNDER REVIEW.**

5 A. As part of the Company's maintenance program, SCE&G undertook a  
6 number of major planned outages during the Review Period. A discussion of each  
7 major outage follows.

8 Canadys Unit 1 came off line in the Fall of 2008 to replace the temporary  
9 main step-up transformer that was installed on this unit during the Fall of 2007.  
10 The temporary unit performed well and the newly rebuilt transformer was put into  
11 place during the Fall outage.

12 Canadys Unit 2 came off line in the Spring of 2008 for a major turbine  
13 outage. During this outage, SCE&G conducted a generator inspection which led  
14 us to do a full generator stator rewind in the Fall of 2008.

15 A major turbine outage was conducted on the Urquhart Unit 1 turbine  
16 during the Fall of 2008. During this time, maintenance was also performed on the  
17 Unit 5 gas turbine.

18 Williams Station had a major outage in the Spring of 2008 to rewind the  
19 rotor, install a permanent exciter and do boiler work. This outage also allowed  
20 removal of the leased exciter that had been in place since the Spring of 2007.

21 A major outage also occurred in the Fall of 2008 to tie-in the Selective  
22 Catalytic Reduction ("SCR") equipment at Cope Station. This outage lasted

1 approximately 12 weeks. Additional generator inspections, boiler work and plant  
2 maintenance were performed during this time.

3 Jasper Station continues to run well since the most severe vibration issues  
4 we experienced earlier were resolved during the Fall of 2007. At this point, we  
5 are still planning to do a generator replacement on the Jasper steam turbine in the  
6 Spring of 2010.

7 **Q. PLEASE DISCUSS ANY SIGNIFICANT FORCED OUTAGES FOR THE**  
8 **PERIOD UNDER REVIEW.**

9 A. SCE&G's Fossil/Hydro operations defines a significant forced outage as  
10 any forced outage in excess of seven (7) days. Fossil/Hydro did not have any  
11 significant forced outages during the Review Period.

12 **Q. WHAT HAS BEEN SCE&G'S FOSSIL SYSTEM FORCED OUTAGE**  
13 **RATE FOR THE PERIOD UNDER REVIEW?**

14 A. Fossil/Hydro experienced a system forced outage rate on its fossil units  
15 (including Combined-Cycle Units) of 1.96% in the Review Period. "Forced  
16 outage rate" is the percentage of the total hours that generating units are forced out  
17 of service (for various reasons) compared with the total hours in service for a  
18 period. The North American Electric Reliability Council ("NERC") national five  
19 year (2003-2007) average for forced outage rate for all units is 5.61%.

1 **Q. PLEASE DISCUSS THE AVAILABILITY OF SCE&G'S FOSSIL PLANTS**  
2 **DURING THE REVIEW PERIOD.**

3 A. SCE&G had an availability factor of its fossil plants (including Combined  
4 Cycle Units) of 85.17% for the Review Period. Availability factor is a measure of  
5 the actual hours that the generation units are available (overall readiness to provide  
6 electricity) divided by the total hours in the eleven-month Review Period.  
7 Availability is not affected by how the unit is dispatched or by the demand from  
8 the system when connected to the grid. However, it is impacted by the planned  
9 and maintenance shutdown hours. The NERC national five year (2003-2007)  
10 average for availability from all units was 87.45%. SCE&G's availability factor  
11 was slightly lower than the NERC national five-year average due to the major  
12 planned outages previously discussed in my testimony. However, during the  
13 summer peak period, June 1, 2008 through September 30, 2008, SCE&G operated  
14 at an availability factor of 94.77%.

15 **Q. WHAT HAS BEEN THE HEAT RATE OF THE FOSSIL UNITS DURING**  
16 **THE REVIEW PERIOD?**

17 A. Heat rate is a way to measure the thermal efficiency of a power plant. It is  
18 the number of British Thermal Units (Btu) of fuel required to generate one (1)  
19 kilowatt-hour (kWh) of electricity. The coal fired steam unit heat rate for the  
20 period February 1, 2008 through December 31, 2008 is 9,954 Btu/kWh.  
21 McMeekin Station had the best heat rate in our system at 9,477 Btu/kWh followed  
22 by Cope Station at 9,660 Btu/kWh and Williams Station at 9,677 BTU/kWh.

1           In the December 2008 issue of *Electric Light & Power*, SCE&G was  
2 recognized for having three of its plants listed in the top 20 most energy efficient  
3 coal fired plants in the nation during calendar year 2007. Cope Station ranked 4th  
4 at 9,167 Btu/kWh. McMeekin Station ranked 11th at 9,485 Btu/kWh and  
5 Williams Station ranked 16th at 9,534 BTU/kWh. This ranking means that three  
6 (3) of our six (6) coal fired units are ranked in the top 20 plants in the country for  
7 efficiency. These three (3) plants represent 50% of our coal-fired generating  
8 capacity.

9 **Q.   WHAT IMPROVEMENTS HAS THE COMPANY MADE TO REDUCE**  
10 **EMISSIONS AT ITS COAL FIRED PLANTS?**

11 A.           In March 2005, the United States Environmental Protection Agency  
12 (“EPA”) issued a final rule known as the Clean Air Interstate Rule (“CAIR”).  
13 CAIR required that the District of Columbia and twenty-eight states, including  
14 South Carolina, reduce sulfur dioxide (“SO<sub>2</sub>”) and nitrogen oxide (“NO<sub>x</sub>”)  
15 emissions in order to attain mandated air quality levels. CAIR established  
16 emission limits to be met in two phases beginning in 2009 and 2015, respectively  
17 for NO<sub>x</sub> and 2010 and 2015, respectively for SO<sub>2</sub>. In addition, the EPA required  
18 some states to enact a State Implementation Plan designed to address air quality  
19 issues. The South Carolina State Implementation Plan (the “Plan”) required,  
20 among other things, the reduction of SO<sub>2</sub> emissions from coal-fired generating  
21 facilities. The Plan also required a reduction in NO<sub>x</sub> emissions in the months of

1 May through September until 2009 when the CAIR limits would become effective.  
2 CAIR and the Plan directly impacted SCE&G and GENCO.

3 As a result of CAIR and the Plan and to meet its compliance requirements,  
4 SCE&G installed Selective Catalytic Reduction (“SCR”) equipment at its Cope  
5 Station in the Fall of 2008. The SCR began full time operation on January 1, 2009  
6 and has run well since that time. It is capable of reducing NOx emissions at the  
7 Cope Station by approximately 90%. SCE&G is also utilizing the existing SCRs  
8 at Williams and Wateree Station along with previously installed low NOx burner  
9 installations at the other coal fired units to meet the CAIR requirements.

10 Additionally, SCE&G is in the process of installing flue gas desulfurization  
11 (FGD) equipment, commonly known as wet scrubbers, at Wateree and Williams  
12 Station to reduce SO<sub>2</sub> emissions. These projects are currently on schedule. The  
13 scrubbers should be on line and tested during the summer and fall of 2009 with the  
14 goal of commercial operation of the equipment by January 1, 2010. There will  
15 be some reduction in mercury as a result of the wet scrubber installations also.  
16 The reductions in emissions resulting from the installation of the SCR’s and the  
17 wet scrubbers will be a great benefit to the environment of South Carolina.  
18 Furthermore, the Company believes that there are significant environmental  
19 benefits to be achieved through SO<sub>2</sub> and NOx emissions and that this equipment  
20 will be critical to meeting future regulatory requirements.

21 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

22 A. Yes.